

PATENT COOPERATION TREATY

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
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PCT

WRITTEN OPINION OF THE INTERNATIONAL
PRELIMINARY EXAMINING AUTHORITY
(PCT Rule 66)

Date of mailing
(day/month/year) - 1 JUL 2005

Applicant's or agent's file reference
NANY/20402181/KC

REPLY DUE within **TWO MONTHS**
from the above date of mailing

International application No.
PCT/SG2004/000371

International filing date (day/month/year)
17 November 2004

Priority date (day/month/year)
18 November 2003

International Patent Classification (IPC) or both national classification and IPC
Int. Cl. ⁷ B81B 7/00, 1/00; B01D 61/42

Applicant
NANYANG TECHNOLOGICAL UNIVERSITY et al

☒ The written opinion established by the International Searching Authority:
☒ is ☐ is not
considered to be a written opinion of the International Preliminary Examining Authority.

2. This **second** (second, etc.) opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

The applicant is hereby invited to reply to this opinion.

When? See the Reply Due date indicated above. However, the Australian Patent Office will not establish the Report before the earlier of (i) a response being filed, or (ii) one month before the **Final Date** by which the international preliminary examination report must be established. The Report will take into account any response (including amendments) filed before the Report is established. **If no response is filed by 1 month before the Final Date**, the international preliminary examination report will be established on the basis of this opinion.

Applicants wishing to have the benefit of a further opinion (if needed) before the report is established should ensure that a response is filed at least 3 months before the **Final Date** by which the international preliminary examination report must be established.

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3.
For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4bis.
For an informal communication with the examiner, see Rule 66.6.

4. The **FINAL DATE** by which the international preliminary report on patentability (Chapter II of the PCT) must be established according to Rule 69.2 is: 18 March 2006

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WRITTEN OPINION OF THE
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International application No.

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Box No. I **Basis of the opinion**

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item:

☐ This opinion is based on a translation from the original language into the following language
which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1 (b))
- ☐ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this opinion has been established on the basis of *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed.")*:

☐ the international application as originally filed/furnished

☒ the description: pages 1-12, as originally filed/furnished
pages , received by this Authority on with the letter of
pages , received by this Authority on with the letter of

☒ the claims: pages , as originally filed/furnished
pages 1-4* (refer to Box VII), as amended (together with any statement) under Article 19,
pages , received by this Authority on with the letter of
pages , received by this Authority on with the letter of

☒ the drawings: pages 1/5-5/5, as originally filed/furnished
pages , received by this Authority on with the letter of
pages , received by this Authority on with the letter of

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to the sequence listing (*specify*):

4. ☐ This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to the sequence listing (*specify*):

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Box No. V **Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims 1-33	YES
	Claims	NO
Inventive step (IS)	Claims 1-33	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-33	YES
	Claims	NO

2. Citations and explanations:

NOVELTY (N) AND INVENTIVE STEP (IS) claims 1-33.

The invention of the claims is a method of actuating and an actuator operated by electroosmotic force. No individual citation or obvious combination of citations disclose or fairly suggest all of the features of such an actuator.

The closest art of US 6537437 discloses a similar device (Fig. 6). However, it has a closed chamber 72 with a movable/deformable membrane 74 connecting an actuator arm 76 and a pump 70, as opposed to an open-ended tube with an actuator/piston in direct fluid communication with the liquid in the tube (wherein an electrical field is applied along a lengthwise axis across the tube) as defined in the present claims. The latter device offers a simpler and more compact structure and does not appear to be obvious from the teaching of the prior art. Therefore, the invention as defined in the present claims is considered to be novel and inventive.

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Box No. VII **Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

The amended claims pages numbered pages 1-4, are not continuous from the description pages ending at page 12.